

fies its title, and stands entirely apart. The alarming illustration with which it opens, representing a statue of Louis Agassiz plunged head-downwards in the ground, is not symbolical of the tendencies of the text. The author traces the growth of geological philosophy without exulting over the imperfections of those who have gone before. The hardy old *pièces justificatives* are quoted, but are supplemented by observations of very recent origin. On p. 141, for instance, Day and Shepherd's work on the volcanic gases of Hawaii is cited in refutation of the critical thesis so enticingly maintained by Brun; but how many of our current text-books have got so far as mentioning Brun? He certainly never shook Tarr's faith in the potency of steam as a volcanic agent ("College Physiography," p. 444), and Prof. Gregory's references are all the more welcome as recording a really memorable, if short-lived, controversy.

The chapters on "How mountains are made," with its review of the possible influence of radium, and on "How mountains are upheld," with its lucid exposition of isostasy, are good examples of Prof. Gregory's method. The section devoted to life-history, occupying nearly half the book, contains no detailed description of stratified formations, but consists of essays on "The Origin of Life," "The Interpretation of Fossils," "The Evolution of Mammals," and so forth. Miss Alice Woodward has contributed some spirited original drawings of incidents in the life of fossil vertebrates, and Hagenbeck's models at Hamburg are also utilised. In these chapters the terrestrial and fluvial origin of the Old Red Sandstone conglomerates is well stated (p. 204); we are introduced to Gigantosaurus of East Africa, the superdreadnought of land-animals (p. 259); and to the beaked flints from the English Pliocene (p. 306), for which the author is quite willing to accept a human origin.

On glacial matters he preserves considerable caution; here only his geology seems not quite of to-day, though it is that of a very recent yesterday. To describe (p. 212) the evidence of Permian glaciation as indicating that "the climate of parts of the Southern Hemisphere was therefore colder than it is at present," must be regarded as a very moderate statement. In his memorable journeys in Spitsbergen, Prof. Gregory (p. 227) was unfortunate in not coming across modern boulder-clays. The precise parallel between the material left behind by the von Post glacier and that of deposits in the British Isles would, for instance, have reassured him. Too little seems made of the fact that sheets of boulder-clay represent the unmeltable residue of glaciers that, in their lower portions, consist half of ice and half

of stones. During the melting of such glaciers there is no copious flow in the lower layers sufficient to sweep away all the finer particles. The loamy matter settles downwards in the interstices of the abundant and striated stones.

The fine series of photographs of Javan volcanoes is very welcome. So is the whole of this stimulating volume. The author does not accept (p. 81) the opinion of German writers as to the origin of their own word *feldspath*; but A. Brongniart attempted the same thing in 1807 in his "Traité de Minéralogie" (p. 355) without success.

(2) The handsome book by the late Prof. Tarr and Mr. L. Martin is of the serious and detailed type suggested by its title. It owes much to the extensive and observant travels of Prof. Tarr, and particularly to his work on glaciers and recent uplifts in Alaska (pp. 214, 390, etc.). The illustrations are numerous, and some of the diagrams would bear enlargement, those on river-erosion, for instance, being not too clear (p. 557, etc.). The view of Innsbruck on p. 525 represents the snow of spring or autumn, but not "The Alps rising above the snow line." The illustrations, however, generally supplement in a valuable way those of European text-books. The treatment of the features due to stationary and shrinking ice-sheets is especially interesting (ch. ix). The last seven chapters, dealing with the atmosphere and terrestrial magnetism, are due to the faithful and experienced editor, Mr. L. Martin, who has worked and travelled with Prof. Tarr.

GRENVILLE A. J. COLE.

MATHEMATICAL TEXT-BOOKS.

- (1) *Pendlebury's New Concrete Arithmetic*. By C. Pendlebury and H. Leather. First Year. Pp. 57. Price 4d. Second Year. Pp. 54. Price 4d. Third Year. Pp. 57. Price 4d. Fourth Year. Pp. 56. Price 6d. Fifth Year. Pp. 71. Price 6d. (London: G. Bell and Sons, Ltd., 1914.)
- (2) *A First Course in Mathematics for Technical Students*. By P. J. Haler and A. H. Stuart. Pp. vi+125. (London: University Tutorial Press, Ltd., 1914.) Price 1s. 6d.
- (3) *A Course of Geometry Theoretical and Practical: a Class-book for Secondary and Technical Schools*. By A. H. Bell. Pp. viii+127. (London: Rivingtons, 1914.) Price 2s. 6d.
- (4) *A Treatise on Dynamics*. By Dr. W. H. Besant. Revised and enlarged by A. S. Ramsey. Fifth edition. Pp. xv+443. (London: G. Bell and Sons, Ltd., 1914.) Price 12s.
- (5) *Examples and Test Papers in Algebra*. By W. J. Walker. Parts ii. and iii. Pp. viii+

163+338. (London: Mills and Boon, Ltd., 1914.) Price 1s. 3d.

(6) *Elementary Mathematical Analysis: a Text-book for First Year College Students.* By Prof. C. S. Slichter. Pp. xiv+490. (New York and London: McGraw-Hill Book Co., Inc., 1914.) Price 10s. 6d. net.

(7) *Stability and Equilibrium of Floating Bodies.* By B. C. Laws. Pp. ix+251. (London: Constable and Co., Ltd., 1914.) Price 10s. 6d. net.

(1) **T**HIS set of books on arithmetic consists chiefly of examples, carefully graded in difficulty. No answers are given; teachers who use these books will look for an edition in which they are supplied. The course includes mensuration, percentage, and interest.

(2) The authors of this small text-book have succeeded in creating a "workshop atmosphere" around this elementary course; not only are the problems of a practical nature, but the student is frequently referred to drawings of simple forms of mechanism, which illustrate and furnish the data of the example set him. The range of the book includes practical arithmetic, mensuration, graphical work, and simple algebraic processes.

(3) This book is framed on the lines recommended by the circulars of the Board of Education, particularly in the first forty pages. It is claimed that the requirements of the ordinary leaving-school examinations are met, but the book is so small that most teachers will find it necessary to supplement it. There are comparatively few examples, those given being mainly numerical. Regarded as an introductory course, this small volume is of distinct merit.

(4) Dr. Besant's treatise on dynamics is well known to many generations of Cambridge men, and its re-issue in an enlarged form will doubtless be welcomed. Mr. Ramsey, who undertook a few years ago, at the author's request, the editing of part i. and the writing of part ii. of his treatise on hydromechanics, has also found time to edit and supplement this remaining volume. The increase in size is considerable, partly owing to additions to the text, but more to the very large number of problems which are now incorporated. Numerous illustrative examples are fully worked out, and notes are frequently appended to them, which the student will find instructive. We have no doubt that men reading for the second part of the Mathematical Tripos will find this volume most helpful.

(5) This collection of examples and papers is conservative in type. There is little note of originality either in arrangement or material. With regard to bookwork, only the chief theorems are inserted, and there is little explanatory matter.

Part ii. includes progressions, variation, and gradients; part iii. contains the logarithmic and exponential series.

(6) This book, designed for first-year college students in America, corresponding roughly to the last stage in the secondary schools of this country, is intended to show the application of simple mathematical principles and operations to practical life. No great manipulative power is demanded of the reader; the author's object is to inspire him with new ideas and broaden his outlook. The central theme of the book is functionality. This is applied to power functions, exponential functions, and periodic functions; the fundamental transformations are treated from a kinematic point of view, by translation, rotation, and shear. The text is interesting throughout, and the author has collected an admirable set of practical exercises.

(7) This treatise for engineering students deals with the stability of bodies floating either in air or water. There are two introductory chapters which summarise the principles of rigid dynamics and hydrostatics, specially needed for the course. The author then passes to the stability of ordinary ship-forms, and this occupies nearly half the book, dealing with, among many other things, stability curves, trim curves, stability at high speeds, effect of wind and waves. In the next chapter he turns to submarines, the action of rudders, transverse stability, etc., and this is followed by the consideration of floating docks, aircraft, and caissons. The chapter on aircraft will probably be of interest to a wider circle than any other part of the book, and may be read independently. The clearness of the diagrams deserves a special word of praise.

OUR BOOKSHELF.

A First Book of Commercial Geography. By T. Alford Smith. Pp. viii+151. (London: Macmillan and Co., Ltd., 1915.) Price 1s. 6d.

MR. ALFORD SMITH'S book has many useful characteristics. It is clearly written, has good maps and diagrams, and a number of appropriate pictures, and includes well-chosen and suggestive examination questions. The scope of commercial geography, however, as specified here, may not appeal to all. The statement, for example, that in order to understand commercial geography it is necessary to know what processes an article has to undergo in order to become an article of commerce, needs cautious application; it is a fault of some larger and more advanced works in this subject that, in the direction especially of manufacture, they wander far outside geographical limits. And perhaps, on the other hand, there is lacking in the book under notice a sufficiently forcible exposition of the principles